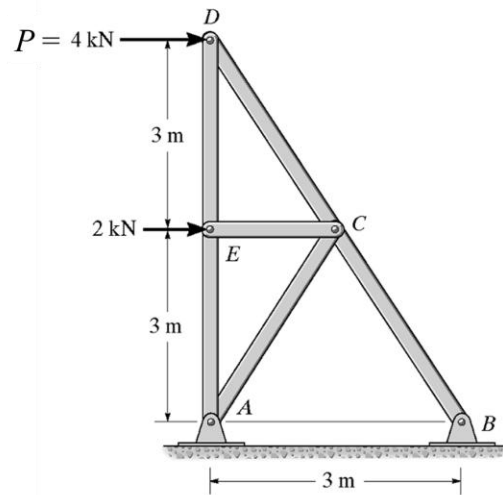


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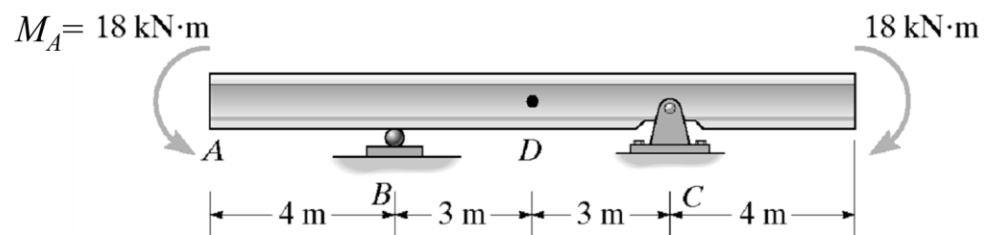
Student ID:

AM34: Castigliano's Theorem

1. Determine the horizontal displacement of point  $D$  using Castigliano's theorem. Each steel member has a cross sectional area of  $300 \text{ mm}^2$ .  $E_{st} = 200 \text{ GPa}$ .



2. The steel beam has a moment of inertia of  $I = 125(10^6) \text{ mm}^4$ . Determine the slope at A using Castigliano's theorem.  $E_{st} = 200 \text{ GPa}$ .

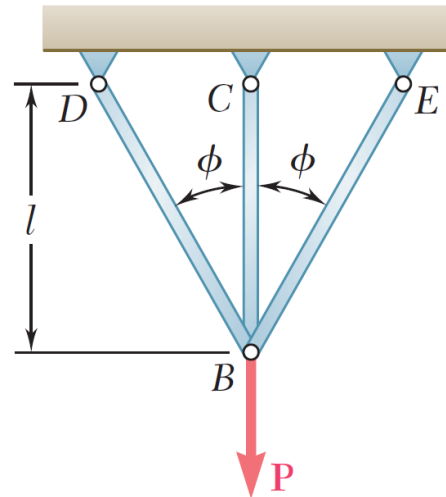


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AM34: Castigliano's Theorem

3. Three members of the same material and same cross sectional area are used to support the load  $P$ . Determine the force in member  $BC$  using Castigliano's theorem.



4. The beam is supported by a pin at  $A$ , a spring having a stiffness  $k$  at  $B$ , and a roller at  $C$ . Determine the force the spring exerts on the beam using Castigliano's theorem.  $EI$  is constant.

